

Fig. 1

100

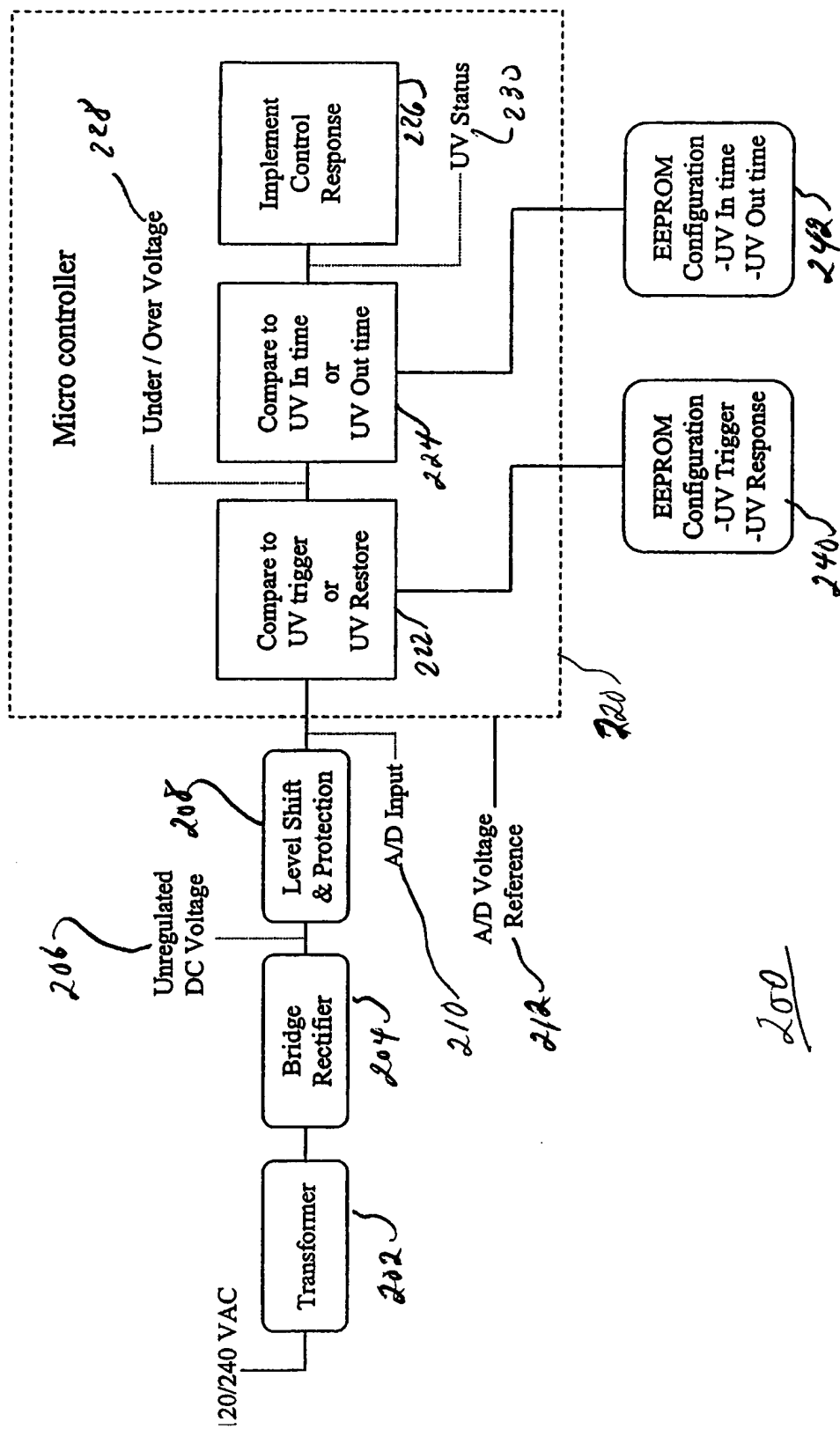


Fig. 2

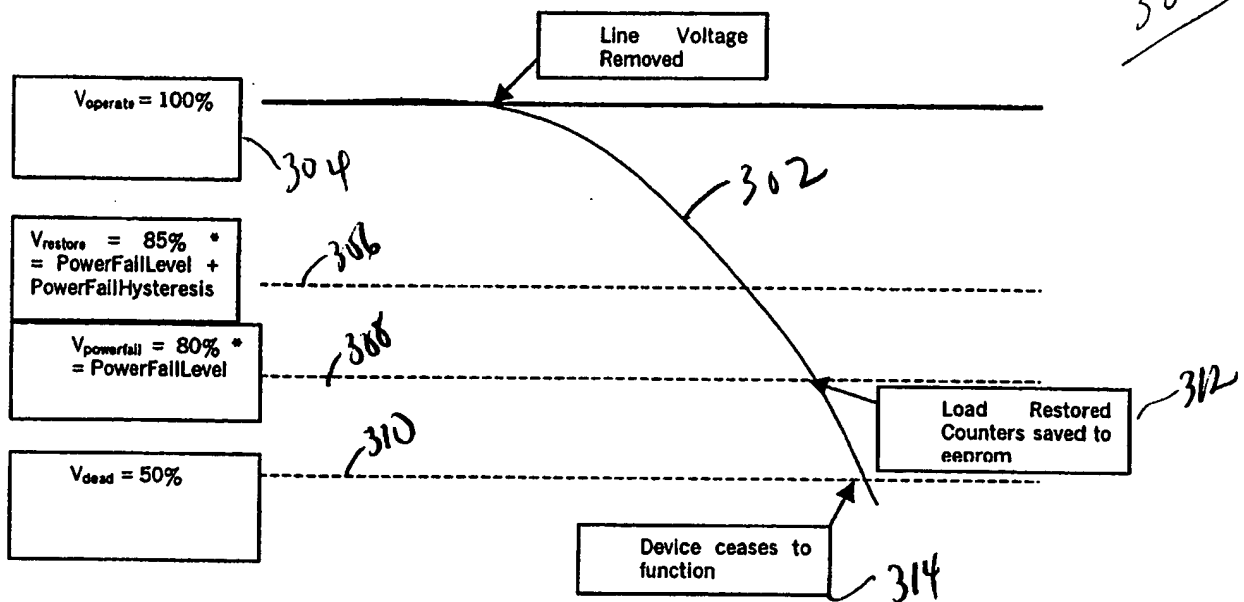


FIG. 3A

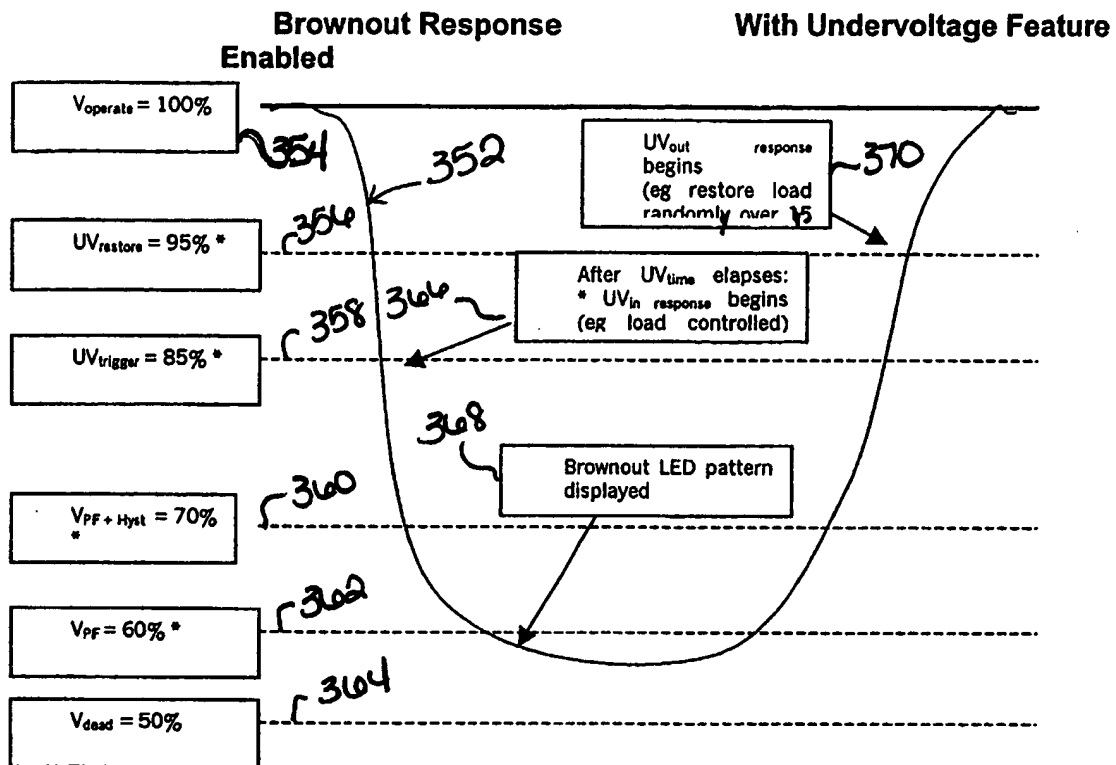


Fig. 3B

**Powerfall Response  
Enabled**

**With Undervoltage Feature**

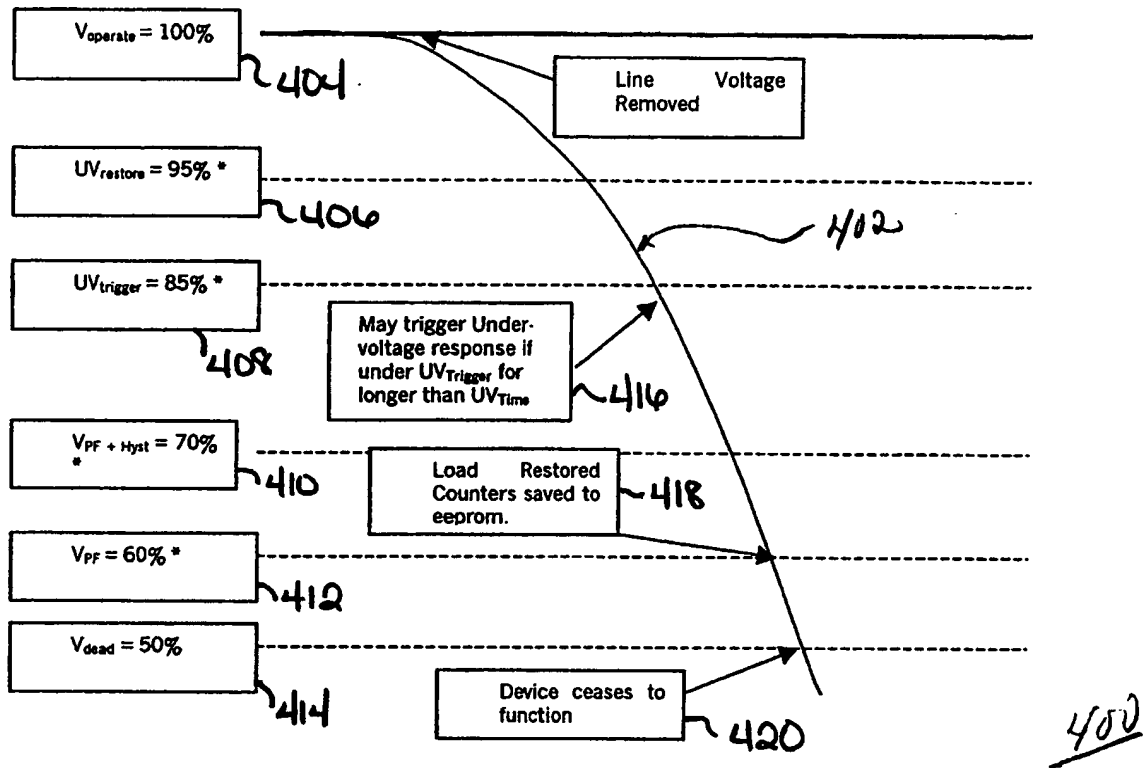


Fig. 4

# Power Restore Response With Undervoltage Feature Enabled

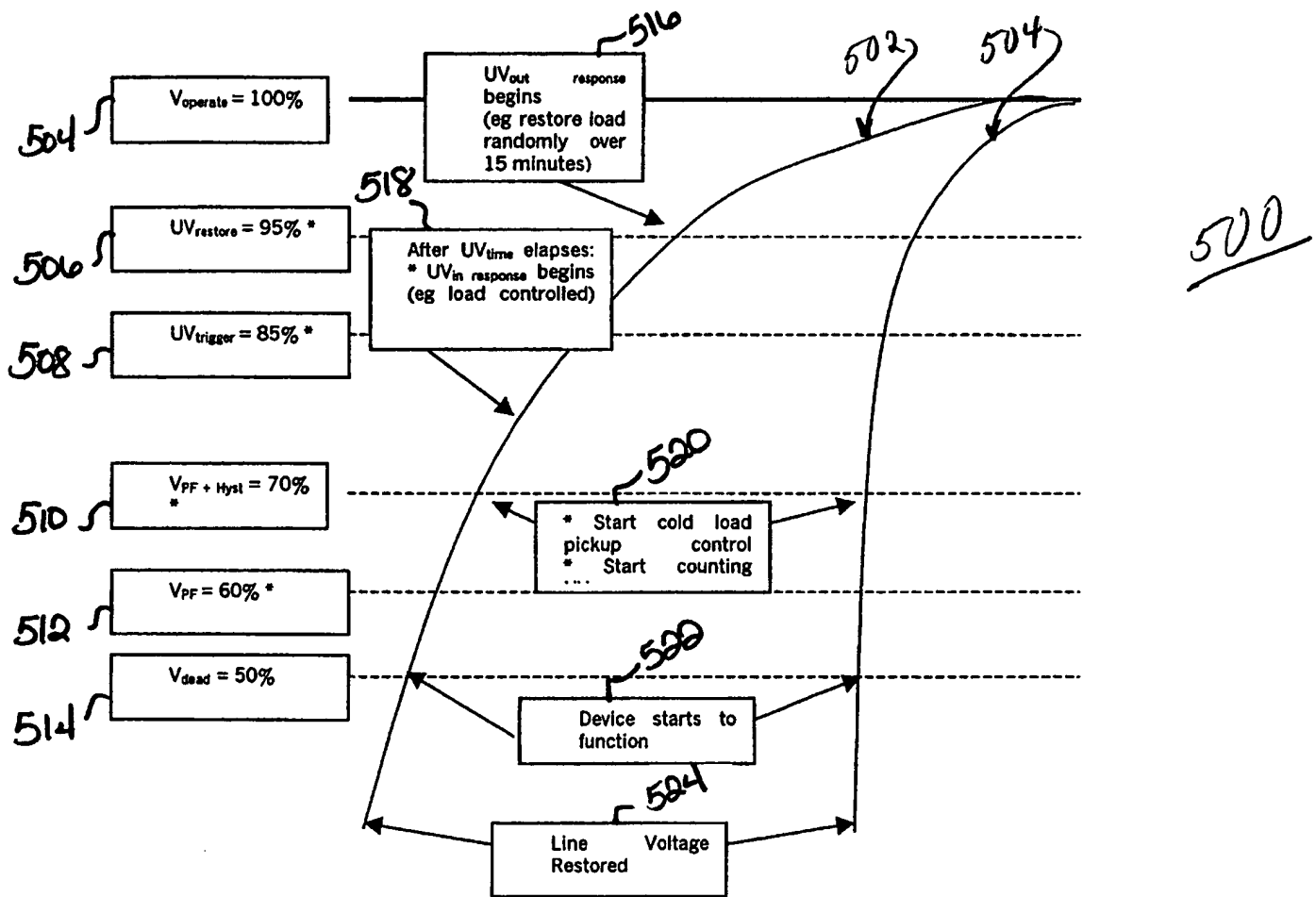
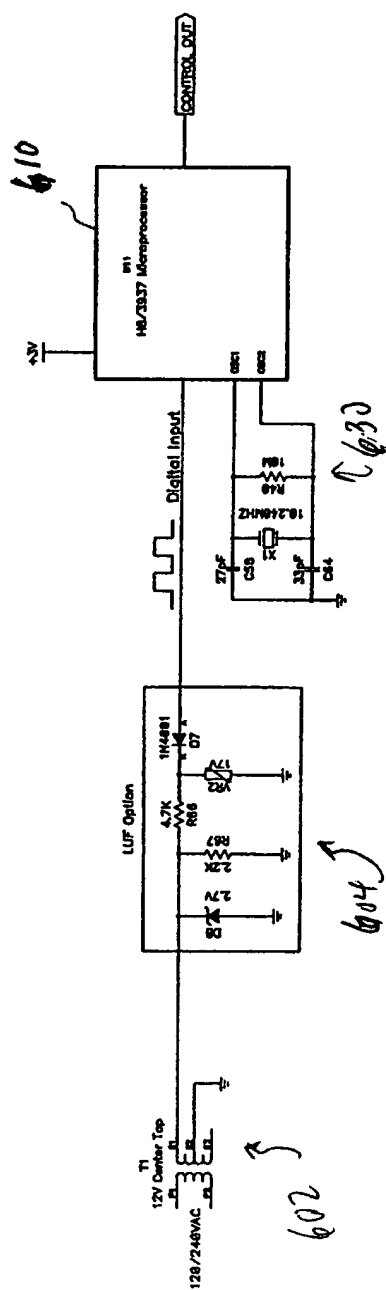


Fig. 5



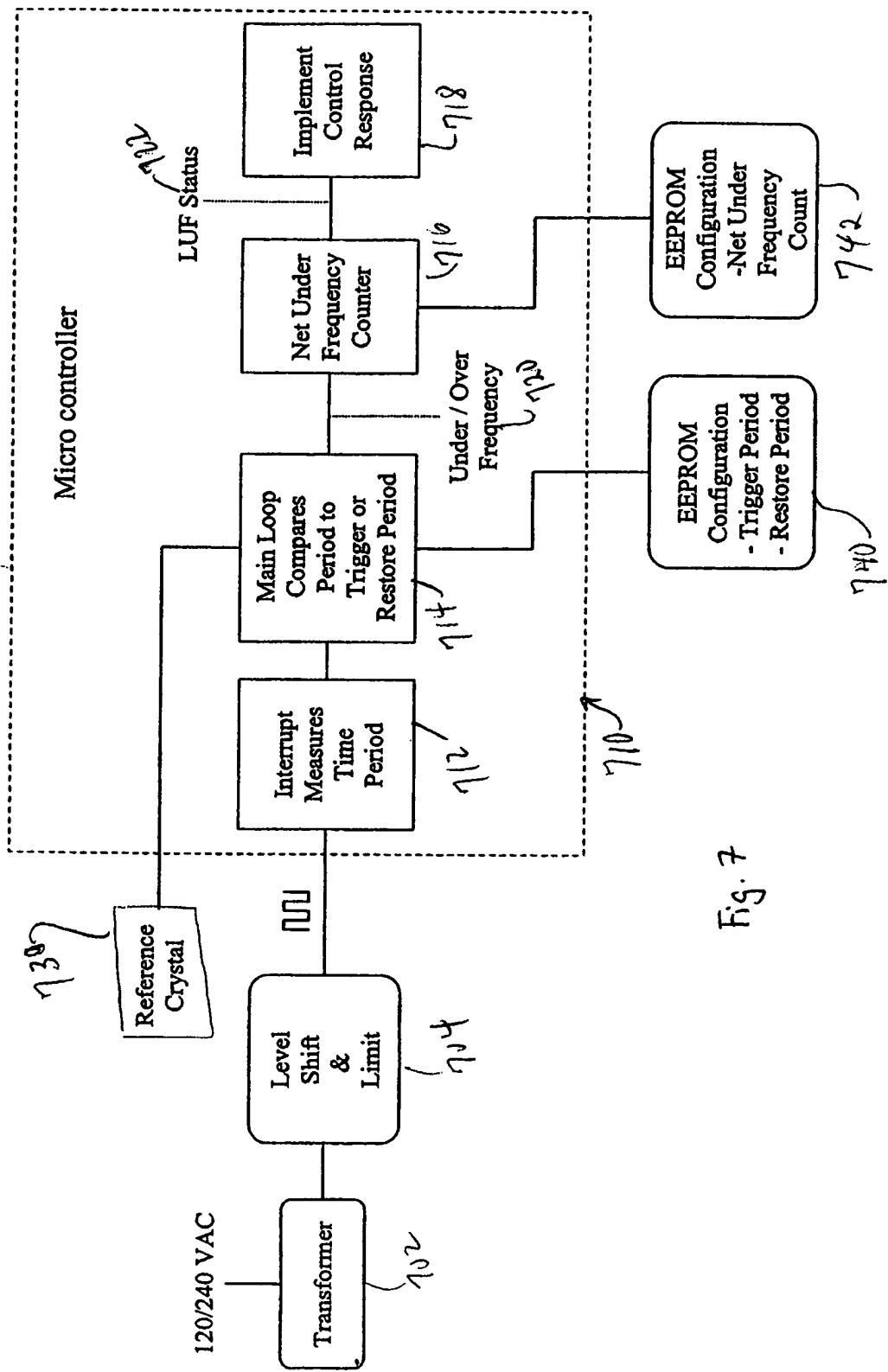


Fig. 7

700



#### 1.1.4.1. Normal Operation (LUFStatus = 0)

For each sample, the length of the cycle is compared to the UFT\_Trigger. If the cycle length is greater or equal to the trigger, then NUFCCount is incremented. If the cycle length is less than the trigger then NUFCCount is decremented.

If NUFCCount reaches NUFTTrigger, then a under frequency condition has been detected and then the LUFInResponse is implemented and the LUFStatus is set.

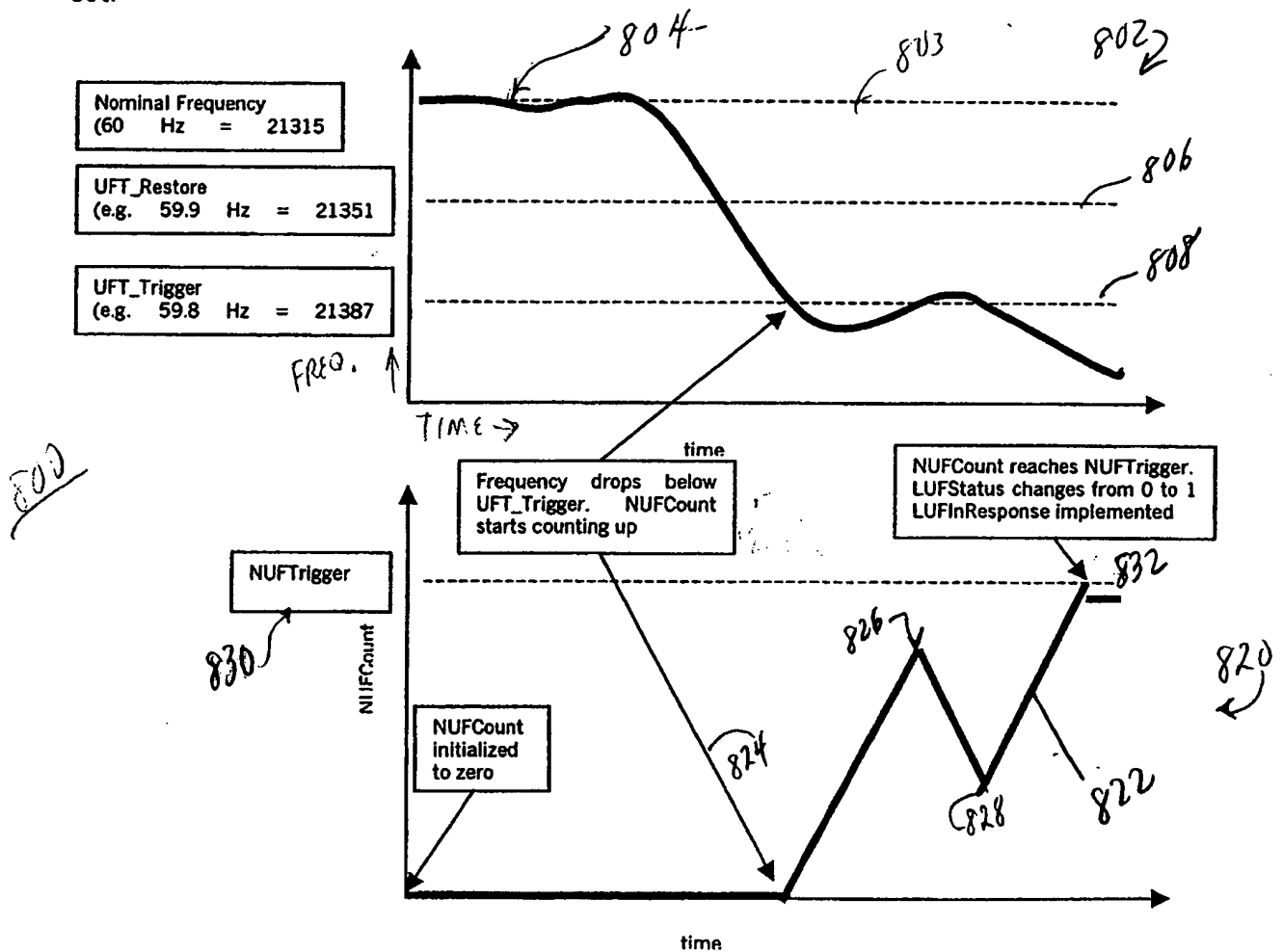


Fig. 8

#### 1.1.4.2. Underfrequency Operation (LUFStatus = 1)

Once LUFStatus is set, then each cycle is compared to UFT\_Restore. If the cycle length is greater or equal to the trigger, then NUFCOUNT is incremented. If the cycle length is less than the trigger then NUFCOUNT is decremented.

If NUFCOUNT reaches zero, then the under frequency condition has ceased, and then the LUFOutResponse is implemented and the LUFStatus cleared.

The NUFCOUNT is always in the range of 0..NUFTrigger.

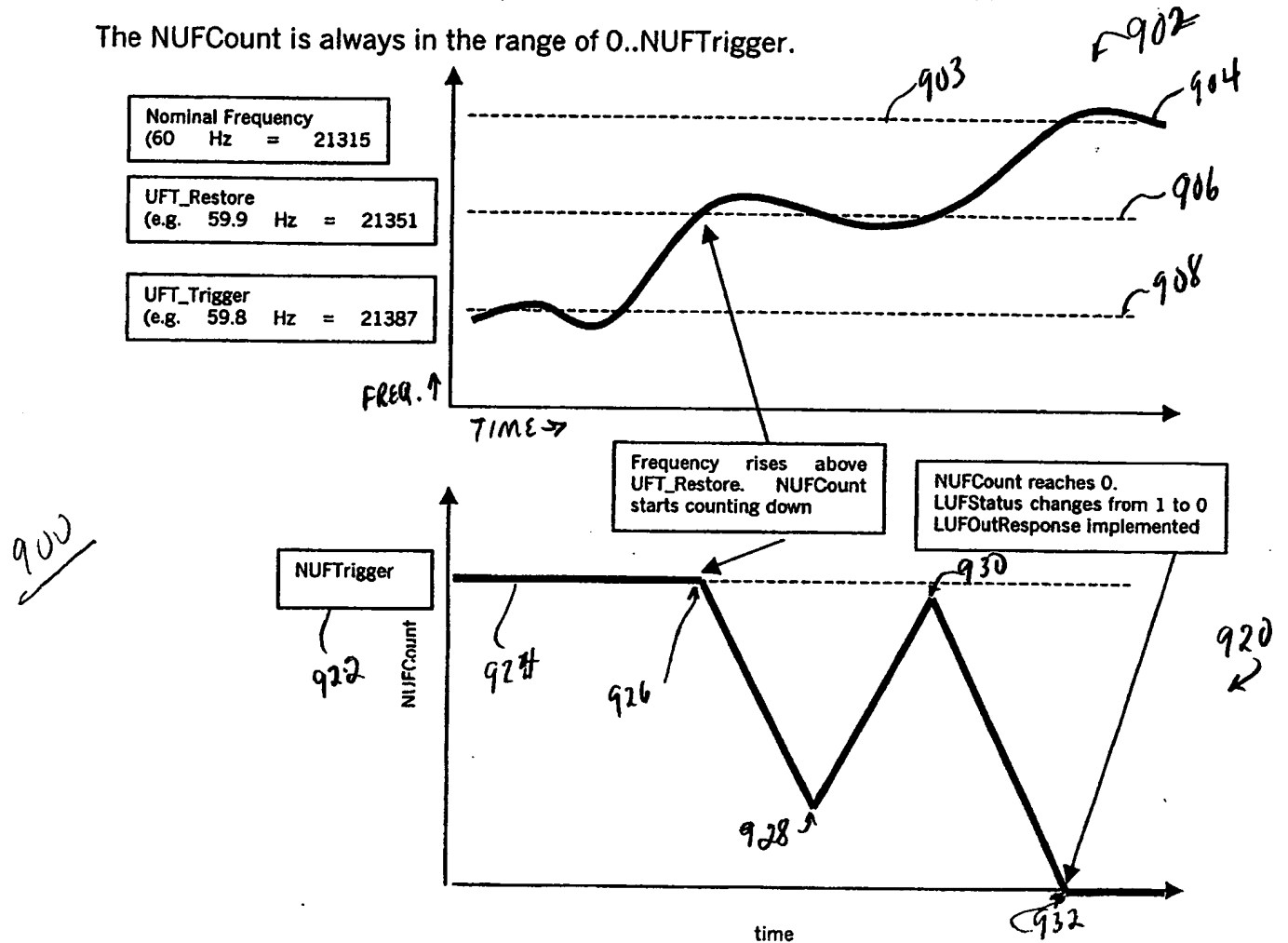


Fig. 9

#### 1.1.5. OPERATION (ALGORITHM)

For each power line cycle:

If LUFStatus is Normal

    If  $MLP \geq UFT\_Trigger$

        Increment NUFCount

    Else

        Decrement NUFCount

    If  $NUFCount \geq NUFTrigger$  AND NUFTrigger is non-zero

        Set LUFStatus to Under-Frequency

        Increment LUFCount

        Perform LUFInResponse (typically control all loads)

Else LUFStatus is Under-Frequency

    If  $MLP \geq UFT\_Restore$

        If  $(NUFCount < NUFTrigger)$

            Increment NUFCount

    Else

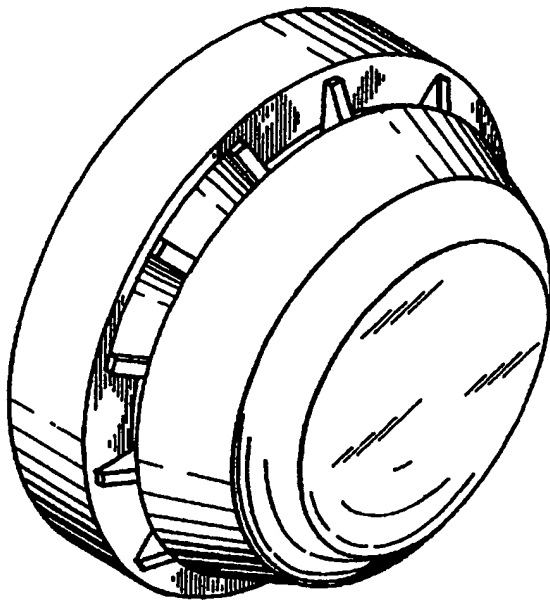
        Decrement NUFCount

    If NUFCount is Zero or NUFTrigger is zero

        Set LUFStatus to Normal

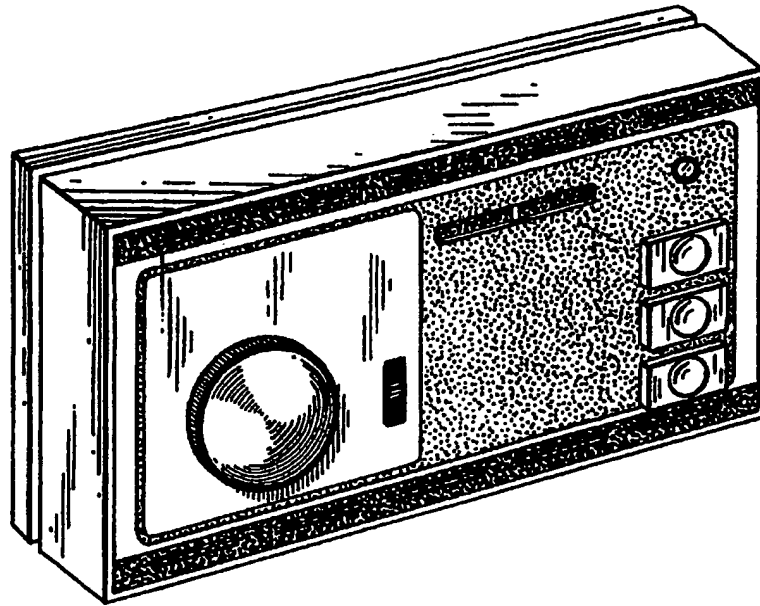
        Perform LUFOutResponse (typically restore all loads)

Fig. 10



**Fig. 11**  
**Prior Art**

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**Fig. 12**  
**Prior Art**